|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|

|  |  |  |  |
| --- | --- | --- | --- |
| **PH 201 Pre-Lab 05** | **Force and Acceleration** | **Name** |  |

 |
|  |
| In this week’s lab we are going to examine how acceleration is changed as we change both the force causing the acceleration and the mass which is accelerated. Naturally if we change both force and mass at the same time we will be unable to see how each affects acceleration. So we shall modify them one at a time. |
|  |
| 1. Assume we measure acceleration as we vary force. If we plot force as our independent variable (i.e. on the x axis) and acceleration as our dependent variable (i.e. on the y axis) and knowing Newton’s second law? What is the slope of this graph? |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
| 2. How do we find mass from this slope? |
|  |
|  |
|  |
| 3. Assume we measure acceleration as we vary the mass. If we plot mass as the independent variable and acceleration as the dependent variable, and again knowing Newton’s second law, what kind of curve will we get? |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
| **OVER 🡪** |
|  |
| 4. Let’s consider the form of the equation as |
| $$a=\left(\frac{1}{m}\right)F=\left(m^{-1}\right)F$$ |
| Now if we plot Ln(a) on the independent axis (Y) and Ln(m) on the dependent axis (X), what should our slope be? |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
| 5. How would you determine the accelerating force from the Ln(a)-Ln(m) plot? |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
| 6. Suppose we have a mass that passes through two photogates which are located a distance x apart, and each of those photogates is capable of providing the speed of the mass as it passes through the photogate, What expression would allow you to calculate the acceleration of the mass? |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |